

AMENDMENTS TO THE CLAIMS:

A complete listing of the claims is provided in accordance with the provisions of 37 CFR § 1.121. This listing of claims will replace all prior versions, and listings, of claims in the application.

1-24. (Cancelled)

25. (Previously Amended) A hydrogen energy system for a facility that is disposed off-board a vehicle, said system comprising:

- (a) a hydrogen generator disposed at said facility for generating hydrogen by water electrolysis using electrical energy received from at least one external source of electrical energy;
- (b) a hydrogen storage apparatus disposed at said facility for storing at least some of the hydrogen generated by said hydrogen generator; and
- (c) a controller having a computer processor for receiving and processing control inputs including
 - (i) data concerning the availability of said electrical energy for use by said hydrogen generator,
 - (ii) data concerning the operating status of said hydrogen generator and
 - (iii) data concerning one or more demands for hydrogen from one or more hydrogen users,

said controller being operatively connected to said hydrogen generator for controlling the generation of hydrogen based at least upon control inputs (i) to (iii).

26. (Cancelled)

27. (Cancelled)
28. (Cancelled)
29. (Cancelled)
30. (Cancelled)
31. (Cancelled)
32. (Cancelled)
33. (Previously Amended) A system as claimed in claim 25 wherein said control inputs further include data concerning said hydrogen storage apparatus.
34. (Previously Presented) A system as claimed in claim 25 wherein said controller further controls the storage of hydrogen.
35. (Previously Amended) A system as claimed in claim 25 further comprising a compressor disposed at said facility for compressing said hydrogen to a minimum desired pressure.
36. (Cancelled)
37. (Previously Presented) A system as claimed in claim 35 wherein said hydrogen is compressed by said compressor prior to storage in said hydrogen storage apparatus.
38. (Original) A system as claimed in claim 35 wherein said controller controls the generation, compression and storage of hydrogen.
39. (Original) A system as claimed in claim 25 wherein said hydrogen generator generates hydrogen at a minimum desired pressure.
40. (Previously Amended) A system as claimed in claim 25 further comprising a hydrogen delivery system disposed at said facility for delivering hydrogen from at

least one of said hydrogen generator and said hydrogen storage apparatus to one or more hydrogen users.

41. (Previously Amended) A system as claimed in claim 40 wherein said one or more hydrogen users include a hydrogen conversion device for powering a vehicle.
42. (Previously Amended) A system as claimed in claim 25 further comprising a hydrogen conversion device disposed at said facility for receiving hydrogen from said hydrogen storage apparatus and converting said hydrogen into electricity.
43. (Original) A system as claimed in claim 42 wherein said hydrogen conversion device is an internal combustion engine.
44. (Original) A system as claimed in claim 42 wherein said hydrogen conversion device is a fuel cell.
45. (Previously Amended) A system as claimed in claim 25 further comprising a hydrogen conversion device disposed at said facility for receiving hydrogen from said hydrogen storage apparatus and converting said hydrogen into thermal energy.
46. (Original) A system as claimed in claim 25 wherein said at least one source of electric energy includes an electricity grid.
47. (Previously Amended) A system as claimed in claim 25 wherein electrical energy for said at least one source of electric energy is generated from one or more primary energy resources.
48. (Original) A system as claimed in claim 47 wherein said primary energy resources include renewable resources.
49. (Original) A system as claimed in claim 47 wherein said primary energy resources include at least one of the following: fossil fuels, wind, solar, nuclear and hydro.

50. (Previously Presented) A system as claimed in claim 25 wherein said data concerning the availability of electrical energy for use by said hydrogen generator includes real time data.
51. (Cancelled)
52. (Previously Presented) A system as claimed in claim 25 wherein said data concerning the availability of electrical energy for use by said hydrogen generator includes stored data.
53. (Previously Presented) A system as claimed in claim 25 wherein said data concerning the availability of electrical energy for use by said hydrogen generator includes data concerning the price of electrical energy.
54. (Previously Presented) A system as claimed in claim 25 wherein said controller modulates the generation of hydrogen by said hydrogen generator based on data including said data concerning the availability of electrical energy for use by said hydrogen generator.
55. (Previously Presented) A system as claimed in claim 42 wherein said controller modulates the generation of electricity by said hydrogen conversion device based on data including said data concerning the availability of electrical energy for use by said hydrogen generator.
56. (Previously Presented) A system as claimed in claim 42 wherein at least some of said electricity generated by said hydrogen conversion device is transmitted to an electricity grid.
57. (Original) A system according to claim 25 wherein said at least one source of electric energy includes at least one non-grid source of electric energy.
58. (Previously Presented) A system as claimed in claim 57 wherein electricity for said at least one non-grid source of electric energy is generated from at least one primary energy resource.

59. (Original) A system as claimed in claim 58 wherein said at least one primary energy resource includes renewable resources.
60. (Previously Presented) A system as claimed in claim 59 wherein said renewable resources include at least one of wind, solar, nuclear and hydro.
61. (Previously Presented) A system as claimed in claim 58 wherein said primary energy resources include at least one of the following: fossil fuels, wind, solar, nuclear and hydro.
62. (Previously Presented) A system as claimed in claim 25 wherein said at least one source of electric energy includes an electricity grid and at least one non-grid source of electric energy and wherein said controller selects one of said at least one sources of electric energy based on data including said data concerning the availability of electrical energy for use by said hydrogen generator.
63. (Previously Amended) A system as claimed in claim 62 further comprising a hydrogen conversion device disposed at said facility for converting hydrogen into electricity.
64. (Previously Amended) A system as claimed in claim 63 wherein said controller modulates the generation of electricity by said hydrogen conversion device based on data including said data concerning the availability of electrical energy for use by said hydrogen generator.
65. (Previously Presented) A system as claimed in claim 63 wherein at least some of said electricity generated by said hydrogen conversion device is transmitted to said electricity grid.
66. (Previously Amended) A system as claimed in claim 47 wherein said data concerning the availability of electrical energy for use by said hydrogen generator includes data pertaining to the type of primary energy resources used for producing said electrical energy.

67. (Cancelled)
68. (Cancelled)
69. (Previously Presented) A system as claimed in claim 33 wherein said controller initiates operation of said hydrogen generator to generate hydrogen when the amount of hydrogen stored in said hydrogen storage apparatus falls below a predetermined amount.
70. (Previously Presented) A system as claimed in claim 25 wherein said hydrogen storage apparatus comprises at least one hydride storage chamber.
71. (Previously Presented) A system as claimed in claim 25 wherein said hydrogen storage apparatus comprises at least one container for storing pressurized hydrogen.
72. (Original) A system as claimed in claim 25 wherein said controller controls the amount of electricity received by said hydrogen generator.
73. (Original) A system as claimed in claim 25 wherein said controller controls the duration of electricity supply to said hydrogen generator.
74. (Previously Presented) A system as claimed in claim 25 wherein said controller comprises a plurality of controllers.
75. (Cancelled)
76. (Cancelled)
77. (Cancelled)
78. (Original) A system as claimed in claim 25 wherein said data is transmitted to said controller by wireless transmission.

79. (Previously Amended) A hydrogen energy system for a facility that is disposed off-board a vehicle, said system comprising:

- (a) a hydrogen generator disposed at said facility for generating hydrogen by water electrolysis using electrical energy received from at least one external source of electrical energy;
- (b) a hydrogen storage apparatus disposed at said facility for storing at least some of the hydrogen generated by said hydrogen generator;
- (c) a controller having a computer processor for receiving and processing control inputs, said control inputs including data concerning one or more demands for hydrogen by one or more hydrogen users, said controller being operatively connected to said hydrogen generator for controlling the generation of hydrogen based at least upon said data concerning one or more demands for hydrogen by one or more hydrogen users.

80. (Previously Amended) A system as claimed in claim 79 further comprising a compressor disposed at said facility for compressing said hydrogen to a minimum desired pressure.

81. (Previously Amended) A system as claimed in claim 79 further comprising a hydrogen conversion device disposed at said facility for receiving hydrogen from said hydrogen storage apparatus and converting said hydrogen into electricity.

82. (Previously Amended) A hydrogen energy system for a facility that is disposed off-board a vehicle comprising:

- (a) a hydrogen generator disposed at said facility for generating hydrogen by water electrolysis using electrical energy received from at least one external source of electric energy;
- (b) a hydrogen storage apparatus disposed at said facility for storing at least some of the hydrogen generated by said hydrogen generator; and

(c) a controller having a computer processor for receiving and processing control inputs, said control inputs including data concerning the price of said electrical energy available for use by said hydrogen generator and data concerning one or more demands for hydrogen by one or more hydrogen users, said controller being operatively connected to said hydrogen generator for controlling the generation of hydrogen based at least upon said data concerning the price of said electrical energy available for use by said hydrogen generator and said data concerning one or more demands for hydrogen by one or more hydrogen users.

83. (Previously Presented) A system as claimed in claim 79 wherein said control inputs further include data concerning the operating status of said hydrogen generator.

84. (Previously Presented) A system as claimed in claim 79 wherein said control inputs further include data concerning the availability of said electrical energy for use by said hydrogen generator.

85. (Previously Presented) A system as claimed in claim 79 wherein said control inputs further include data concerning said hydrogen storage apparatus.

86. (Previously Presented) A system as claimed in claim 79 wherein said controller further controls the storage of hydrogen.

87. (Previously Presented) A system as claimed in claim 79 further comprising a hydrogen delivery system disposed at said facility for delivering hydrogen from at least one of said hydrogen generator and said hydrogen storage apparatus to one or more hydrogen users.

88. (Previously Presented) A system as claimed in claim 79 further comprising a hydrogen conversion device disposed at said facility for receiving hydrogen from said hydrogen storage apparatus and converting said hydrogen into thermal energy.

89. (Previously Presented) A system as claimed in claim 79 further comprising a hydrogen conversion device disposed at said facility for receiving hydrogen from said hydrogen storage apparatus and converting said hydrogen into electricity.
90. (Previously Presented) A system as claimed in claim 79 wherein said at least one source of electrical energy includes an electricity grid.
91. (Previously Presented) A system as claimed in claim 79 wherein said controller modulates the generation of hydrogen by said hydrogen generator.
92. (Previously Presented) A system as claimed in claim 89 wherein said controller modulates the generation of electricity by said hydrogen conversion device.
93. (Previously Presented) A system as claimed in claim 89 wherein at least some of said electricity generated by said hydrogen conversion device is transmitted to an electricity grid.
94. (Previously Presented) A system according to claim 79 wherein said at least one source of electric energy includes at least one non-grid source of electric energy.
95. (Previously Presented) A system as claimed in claim 79 wherein said controller initiates operation of said hydrogen generator to generate hydrogen when the amount of hydrogen stored in said hydrogen storage apparatus falls below a predetermined amount.
96. (Previously Presented) A system as claimed in claim 79 wherein said controller controls the amount of electricity received by said hydrogen generator.
97. (Previously Presented) A system as claimed in claim 79 wherein said controller controls the duration of electricity supply to said hydrogen generator.
98. (New) A system as claimed in claim 79 wherein electrical energy for said at least one external source of electrical energy is generated from one or more primary energy resources.

99. (New) A system as claimed in claim 98 wherein said primary energy resources include renewable resources.
100. (New) A system as claimed in claim 98 wherein said primary energy resources include at least one of the following: fossil fuels, wind, solar, nuclear and hydro.
101. (New) A system according to claim 79 wherein said at least one external source of electrical energy includes at least one non-grid source of electric energy.
102. (New) A system as claimed in claim 101 wherein electricity for said at least one non-grid source of electrical energy is generated from at least one primary energy resource.
103. (New) A system as claimed in claim 102 wherein said at least one primary energy resource includes renewable resources.
104. (New) A system as claimed in claim 103 wherein said renewable resources include at least one of wind, solar, nuclear and hydro.
105. (New) A system as claimed in claim 102 wherein said at least one primary energy resource include at least one of the following: fossil fuels, wind, solar, nuclear and hydro.
106. (New) A system as claimed in claim 79 wherein said at least one external source of electrical energy includes an electricity grid and at least one non-grid source of electrical energy and wherein said controller selects one of said at least one external sources of electrical energy based on data including data concerning the availability of electrical energy for use by said hydrogen generator.
107. (New) A system as claimed in claim 106 further comprising a hydrogen conversion device disposed at said facility for converting hydrogen into electricity.
108. (New) A system as claimed in claim 107 wherein said controller modulates the generation of electricity by said hydrogen conversion device based on data

including data concerning the availability of electrical energy for use by said hydrogen generator.

109. (New) A system as claimed in claim 107 wherein at least some of said electricity generated by said hydrogen conversion device is transmitted to said electricity grid.
110. (New) A system as claimed in claim 106 wherein said data concerning the availability of electrical energy for use by said hydrogen generator includes data pertaining to the type of primary energy resources used for producing said electrical energy.
111. (New) A system as claimed in claim 82 wherein electrical energy for said at least one external source of electric energy is generated from one or more primary energy resources.
112. (New) A system as claimed in claim 111 wherein said primary energy resources include renewable resources.
113. (New) A system as claimed in claim 111 wherein said primary energy resources include at least one of the following: fossil fuels, wind, solar, nuclear and hydro.
114. (New) A system as claimed in claim 82 wherein said data concerning the availability of electrical energy for use by said hydrogen generator includes real time data.
115. (New) A system as claimed in claim 82 wherein said data concerning the availability of electrical energy for use by said hydrogen generator includes stored data.
116. (New) A system according to claim 82 wherein said at least one external source of electric energy includes at least one non-grid source of electric energy.

117. (New) A system as claimed in claim 116 wherein electrical energy for said at least one non-grid source of electric energy is generated from at least one primary energy resource.
118. (New) A system as claimed in claim 117 wherein said at least one primary energy resource includes renewable resources.
119. (New) A system as claimed in claim 118 wherein said renewable resources include at least one of wind, solar, nuclear and hydro.
120. (New) A system as claimed in claim 117 wherein said primary energy resources include at least one of the following: fossil fuels, wind, solar, nuclear and hydro.
121. (New) A system as claimed in claim 82 wherein said at least one external source of electric energy includes an electricity grid and at least one non-grid source of electric energy and wherein said controller selects one of said at least one external sources of electric energy based on data including data concerning the availability of electrical energy for use by said hydrogen generator.
122. (New) A system as claimed in claim 121 further comprising a hydrogen conversion device disposed at said facility for converting hydrogen into electricity.
123. (New) A system as claimed in claim 122 wherein said controller modulates the generation of electricity by said hydrogen conversion device based on data including data concerning the availability of electrical energy for use by said hydrogen generator.
124. (New) A system as claimed in claim 122 wherein at least some of said electricity generated by said hydrogen conversion device is transmitted to said electricity grid.
125. (New) A system as claimed in claim 121 wherein said data concerning the availability of electrical energy for use by said hydrogen generator includes data

pertaining to the type of primary energy resources used for producing said electrical energy.

126. (New) A system as claimed in claim 82 further comprising a compressor disposed at said facility for compressing said hydrogen to a minimum desired pressure.
127. (New) A system as claimed in claim 82 further comprising a hydrogen conversion device disposed at said facility for receiving hydrogen from said hydrogen storage apparatus and converting said hydrogen into electricity.
128. (New) A system as claimed in claim 82 wherein said control inputs further include data concerning the operating status of said hydrogen generator.
129. (New) A system as claimed in claim 82 wherein said control inputs further include data concerning said hydrogen storage apparatus.
130. (New) A system as claimed in claim 82 wherein said controller further controls the storage of hydrogen.
131. (New) A system as claimed in claim 82 further comprising a hydrogen delivery system disposed at said facility for delivering hydrogen from at least one of said hydrogen generator and said hydrogen storage apparatus to one or more hydrogen users.
132. (New) A system as claimed in claim 82 further comprising a hydrogen conversion device disposed at said facility for receiving hydrogen from said hydrogen storage apparatus and converting said hydrogen into thermal energy.
133. (New) A system as claimed in claim 82 further comprising a hydrogen conversion device disposed at said facility for receiving hydrogen from said hydrogen storage apparatus and converting said hydrogen into electricity.

134. (New) A system as claimed in claim 82 wherein said at least one external source of electrical energy includes an electricity grid.
135. (New) A system as claimed in claim 82 wherein said controller modulates the generation of hydrogen by said hydrogen generator.
136. (New) A system as claimed in claim 133 wherein said controller modulates the generation of electricity by said hydrogen conversion device.
137. (New) A system as claimed in claim 133 wherein at least some of said electricity generated by said hydrogen conversion device is transmitted to an electricity grid.
138. (New) A system according to claim 82 wherein said at least one external source of electric energy includes at least one non-grid source of electric energy.
139. (New) A system as claimed in claim 82 wherein said controller initiates operation of said hydrogen generator to generate hydrogen when the amount of hydrogen stored in said hydrogen storage apparatus falls below a predetermined amount.
140. (New) A system as claimed in claim 82 wherein said controller controls the amount of electricity received by said hydrogen generator.
141. (New) A system as claimed in claim 82 wherein said controller controls the duration of electricity supply to said hydrogen generator.